Algebra 2 Honors
Exponential & Logarithmic Functions Final Exam Review

Name:
Date: ______________________

Simplify:

1) $x^4y^3 \cdot (2y^2)$

$2x^4y^5$

2) $(2y^2)^{-3} \cdot 2yx^3$

$\frac{1}{8y^6} \cdot \frac{2yx^3}{1} = \boxed{\frac{x^3}{4y^5}}$

3) $\frac{(x^{-3})^4x^4}{2x^{-3}}$

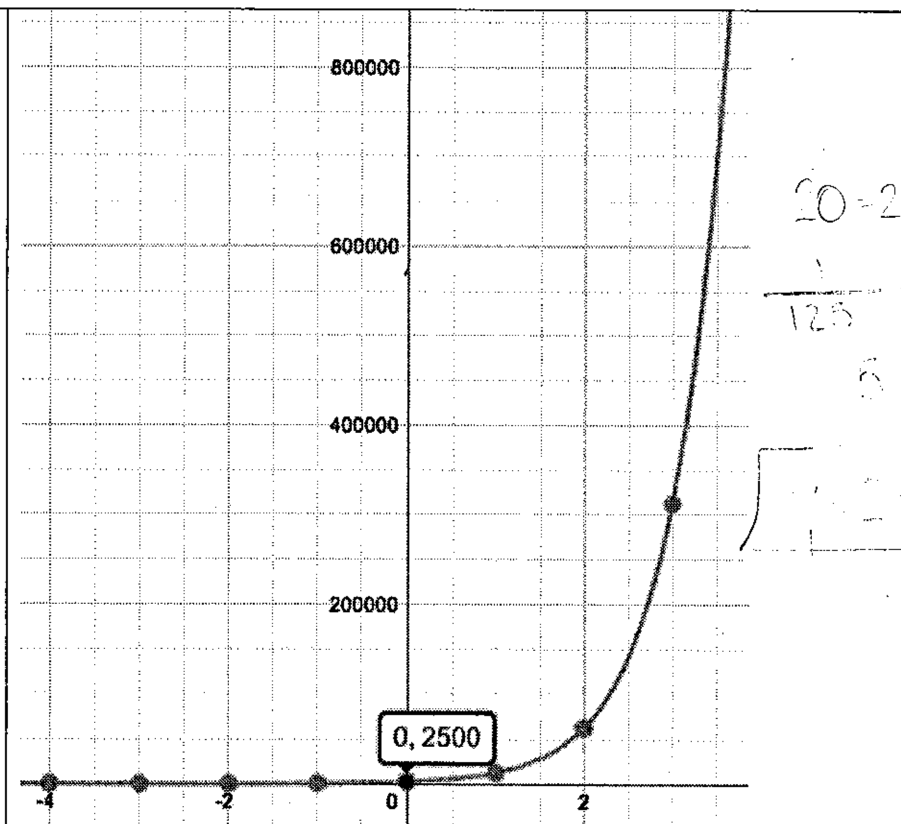
$\frac{x^{-12}x^4}{2x^{-3}} \Rightarrow \frac{x^{-8}}{2x^{-3}} = \frac{x^{3}}{2x^{8}} = \boxed{2x^{5}}$

4) $\frac{(2x^3z^2)^{-3}}{x^3y^4z^2x^{-4}z^3}$ $\rightarrow \frac{1}{8x^9z^6x^3y^4z^2x^{-4}z^3} = \boxed{\frac{1}{8x^8y^4z^{11}}}$

Another data point on this graph is (-3, 20).

Write a function to match this situation.

Write the function two different ways with two different starting values.



-3	-2	-1	0	1	2	3

$a = 2500$

$20 = 2500b^{-3}$

$\frac{1}{125} = \frac{1}{b^3}$

$5 = b$

$\boxed{y = 2500(b)^x}$

Algebra 2 Honors

tions Final Exam Review

			-1	0	1	2	3
			6	4	$\frac{8}{3}$	$\frac{16}{9}$	

5)

$9b^4 = \frac{16}{9}$

$b^4 = \frac{16}{81}$

$b = \frac{2}{3}$

$y = 4\left(\frac{2}{3}\right)^x$

X	-4	-3	-2	-1	0	1	2	3	4
y			12	6	3	$\frac{3}{2}$	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{3}{16}$

6)

$12b^6 = \frac{3}{16}$

$b^6 = \frac{3}{192}$

$b^6 = \frac{1}{64}$

$b = \frac{1}{2}$

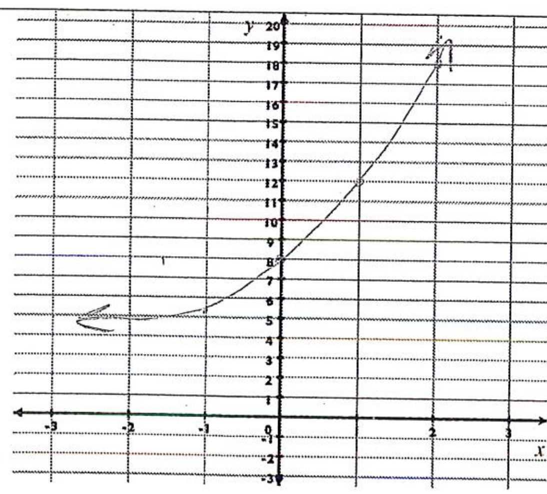
$y = 3\left(\frac{1}{2}\right)^x$

7) A ball reaches a height of 80 inches after one bounce and a height of 12.8 inches on a later bounce. From what height was it dropped?

8)

$f(x) = 8\left(\frac{3}{2}\right)^x$

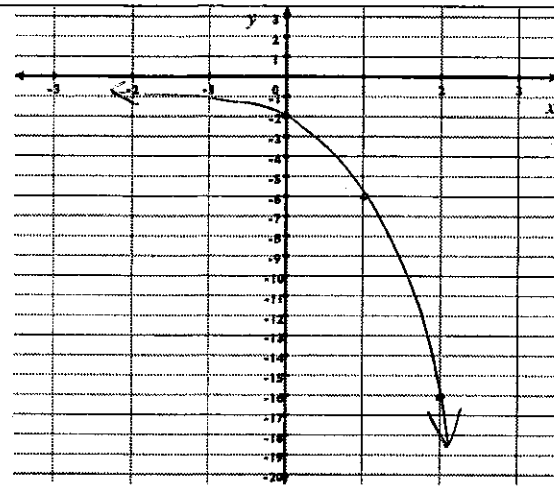
x	y
-2	
-1	
0	
1	
2	



Algebra 2 Honors
Exponential & Logarithmic Functions Final Exam Review

$f(x) = -2(3)^x$

x	y
-2	
-1	
0	
1	
2	



9)

10) Let $f(x) = 3 \cdot 4^x$. Use the law of exponents to explain why each of the following equations is true.

a. $16f(x) = f(x+2)$

$16(3)(4)^x = 3 \cdot 4^x \cdot 4^2$

$48(4)^x = 48(4)^x$

b. $\frac{f(x)}{4} = f(x-1)$

$\frac{3\cdot 4^x}{4} = 3(4)^{x-1}$

$\frac{3\cdot 4^x}{4} = 3\cdot 4^x \cdot 4^{-1}$

$\boxed{\frac{3\cdot 4^x}{4} = \frac{3\cdot 4^x}{4}}$

11) Using the laws of exponents to solve for A: $6 \cdot 4^{x+2} = A \cdot 4^x$

$6\cdot 4^x \cdot 4^2 = A \cdot 4^x$

$96 \cdot 4^x = A \cdot 4^x$

$\boxed{96 = A}$

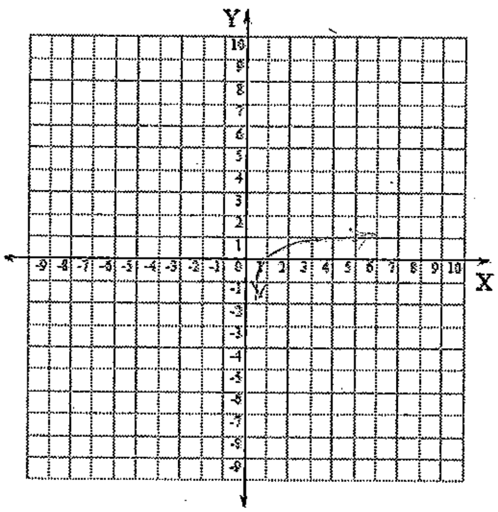
Algebra 2 Honors
Exponential & Logarithmic Functions Final Exam Review

12) Start with $y = 7^{x-3}$ and rewrite the equation in the form $y = a(b^x)$.

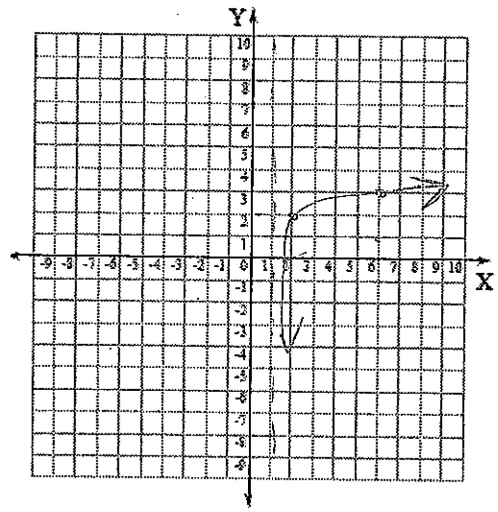
$y = 7^x \cdot 7^{-3}$

$y = \frac{1}{343}(7)^x$

13) Graph $y = \log_5 x$



Graph $y = \log_5 (x - 1) + 2$



14) Each log equation can be rewritten as an exponential equation, and vice versa. Rewrite each equation below in the other form.

a. $y = 7^x$

$\log_7 y = x$

b. $\log_4 x = y$

$4^y = x$

c. $11^y = x$

$\log_{11} x = y$

d. $W^k = B$

$\log_w B = k$

e. $K = \log_w B$

$W^k = B$

f. $\log_{\frac{1}{3}} P = Q$

$\left(\frac{1}{3}\right)^Q = P$

15) Rewrite each expression:

a) $\log_2 8 - \log_2 4$

$\log_2 2$

1

b) $3 \log_b x + \log_b y$

$\log_b x^3 y$

c) $\text{Log}_5 2 + \log_5 6$

$\log_5 12$

d) $3 \log_b 4 - 3 \log_b 2$

$\log_b \frac{4^3}{2^3} \rightarrow \log_b 8$

e) $\text{Log}_3 20 - \log_3 4$

$\log_3 5$

f) $3 \log_2 x + \log_2 y$

$\log_2 x^3 y$

g) $3 \log 2 + \log 4 - \log 16$

$\log \frac{2^3 \cdot 4}{16} \rightarrow \log 2$

h) $\text{Log}_4 64 - \log_4 16$

$\log_4 4$

1

Algebra 2 Honors
Exponential & Logarithmic Functions Final Exam Review

16) Solve:

a. $6^{2x} = 21$

$2x \log 6 = \log 21$

$x = \frac{\log 21}{2 \log 6}$ $\quad x = 0.8496$

b. $3^{x+4} = 101$

$3^x = \frac{101}{89} \Rightarrow x = \frac{\log\left(\frac{101}{89}\right)}{\log 3} \rightarrow x = 0.2008$

c. $9^{2y} = 66$

$y = \frac{\log 66}{2 \log 9} \Rightarrow y = 0.9534$

d. $8 + 10^x = 1008$

$10^x = 1000$

$x = 3$

e. Use the Change of Base Formula to evaluate $\log_3 15$

$\frac{\log 15}{\log 3}$ $\quad 2.465$

f. $\log (2x - 2) = 4$

$10^4 = 2x - 2$

$x = 5001$

g. $\text{Log } 2x + \log x = 11$

$\log 2x^2 = 11$ $\quad x \approx 223607$

$10^{11} = 2x^2$

h. $3 \log x - \log 6 + \log 2.4 = 9$

$\log \left(\frac{x^3}{6}\right) 2.4 = 9$ $\quad 10^9 = \frac{2.4x^3}{6}$

17) Use the Change of Base Formula to evaluate $\log_3 15$

$\frac{\log 15}{\log 3}$ $\quad 2.465$

18) Evaluate $\log_6 12$ and convert it to a logarithm in base 3.

$\frac{\log 12}{\log 6} = 1.3869 \Longrightarrow 3^{1.3869} = 4.5888$

$\boxed{\log_3 4.5888}$